

What is Claimed is:

1. A flow completion system for controlling the flow of fluid from a well bore, the flow completion system comprising:

a tubing spool which includes a central bore that extends axially

5 therethrough and a production outlet which communicates with the central bore;

a tubing hanger which is supported in the central bore and which includes a production bore that extends axially therethrough and a production passageway that communicates between the production bore and the production outlet, the tubing hanger supporting a tubing string which extends into the well

10 bore and defines a tubing annulus surrounding the tubing string;

a first closure member which is positioned in the production bore above the production passageway;

a first annular seal which is positioned between the tubing hanger and the central bore above the production passageway;

15 wherein the first closure member and the first seal comprise a first pressure-containing barrier between the well bore and a surrounding environment;

a second closure member which is positioned in the production bore above the first closure member; and

20 a second annular seal which is positioned between the tubing hanger and the central bore above the first seal;

wherein the second closure member and the second seal comprise
a second pressure-containing barrier between the well bore and the environment;
and

5 wherein both the first and the second barriers are associated with
the tubing hanger.

2. The flow completion system of claim 1, wherein the first and second
closure members each comprise a wireline deployable plug.

3. The flow completion apparatus of claim 1, wherein the first closure
member comprises a first ring seal which is mounted on a wireline deployable
10 plug body and the second closure member comprises a second ring seal which is
mounted on the plug body above the first ring seal.

4. The flow completion system of claim 1, further comprising:
an annulus bore which extends generally axially through the tubing
hanger between the tubing annulus and a portion of the central bore that is
15 located above the second seal; and

an annulus closure member which is positioned in the annulus
bore.

5. The flow completion system of claim 4, wherein:
the annulus bore comprises a generally lateral first branch which is
20 connected to a generally axial second branch; and

the annulus closure member includes a gate that is moveable
generally axially across the first branch between an open position in which a hole

in the gate is aligned with the first branch and a closed position in which the hole is offset from the first branch.

6. The flow completion system of claim 5, further comprising:

a conduit which extends generally axially through the body between

5 the gate and the top of the tubing hanger; and

an actuating mechanism for the gate which is positioned in the conduit.

7. The flow completion system of claim 6, wherein the actuating mechanism comprises:

10 a piston which is movably disposed in the conduit and which is connected to the gate;

means for conveying pressure to a first portion of the conduit to thereby move the gate from a first position to a second position; and

15 means for moving the gate from the second position to the first position;

wherein one of the first and second positions corresponds to the open position of the gate and the other position corresponds to the closed position of the gate.

8. The flow completion system of claim 7, wherein the moving means
20 comprises a mechanical biasing means.

9. The flow completion system of claim 7, wherein the moving means comprises means for conveying pressure to a second portion of the conduit which is separated from the first portion of the conduit by the piston.

Sub A 10. The flow completion system of claim 1, further comprising a tree cap which comprises:

an annular non-metallic body; and

means for securing the body to the tubing hanger or the tubing

5 spool.

11. The flow completion system of claim 10, wherein the body comprises a plurality of radial sections and the tree cap comprises a number of elongated bolts which extend through the body and connect the radial sections.

12. The flow completion system of claim 10, wherein the tree cap further comprises:

~~an annulus seal stab for engaging the annulus bore.~~

MS 6 13. ~~The flow completion system of claim 12, wherein the tree cap further comprises:~~

~~a fluid coupling which is mounted on the body and which is adapted~~

15 ~~to be connected to an external service and control line; and~~

~~a conduit which communicates between the fluid coupling and a bore in the annulus seal stab;~~

~~wherein fluid communication may be established between the annulus bore and the external service and control line through the annulus seal~~

20 ~~stab.~~

~~14. The flow completion system of claim 10, wherein the tree cap is sufficiently lightweight to be installed using an ROV.~~

15. The flow completion system of claim 10, wherein the securing means comprises:

a plurality of collet fingers which are secured to the body;
 a lock mandrel which includes a camming surface; and
 5 a number of locking dogs which are disposed generally radially in the body and which each comprise a first end which is adapted to be engaged by the camming surface and a second end which is adapted to contact one or more of the collet fingers;

wherein actuation of the lock mandrel will force the locking dogs
 10 radially outwardly against the collet fingers to lock the collet fingers in a corresponding groove that is formed on the tubing hanger or the tubing spool.

16. The flow completion system of claim 15, wherein the lock mandrel is adapted to be engaged by an ROV, whereby the ROV can be used to lock the tree cap to the tubing hanger or the tubing spool.

17. The flow completion system of claim 10, wherein the tree cap further comprises:

a landing ring which is movably secured to the body; and
 means for adjusting landing ring axially relative to the body;
 wherein when the tree cap is secured to the tubing hanger or the
 20 tubing spool, the landing ring engages a tubing hanger locking mandrel which is slidably mounted on the tubing hanger;
 whereby the landing ring maintains the position of the tubing hanger locking mandrel fixed relative to the tubing hanger.

35 ~~18~~ The flow completion system of claim ~~17~~, wherein the adjusting means is adapted to be actuated by an ROV.

44 ~~19~~ The flow completion system of claim ~~1~~, further comprising:

a BOP which is removably connectable to the top of the tubing

5 spool and which includes a BOP bore, a set of BOP rams, and at least one choke and kill line that communicates with a portion of the BOP bore which is located below the BOP rams; and

a tubing hanger running tool which is removably connectable to the top of the tubing hanger and which includes a cylindrical outer surface portion, a
10 production port that communicates with the production bore, and an annulus port that comprises a first end which communicates with the annulus bore and a second end which communicates with the outer surface portion;

wherein the BOP rams are adapted to sealingly engage the outer surface portion above the second end of the annulus port;

15 whereby fluid communication between the tubing annulus and the BOP choke and kill line may be established through the annulus bore, the annulus port and the portion of the BOP bore which is located below the first BOP rams.

6 ~~20~~ The flow completion apparatus of claim ~~19~~, wherein the tubing

20 hanger running tool further comprises:

an cylindrical body which has an inner diameter surface and which is sealed to the tubing hanger radially outwardly of the annulus bore;

a tubular member which has an outer diameter surface and which is received within the body and sealed to the tubing hanger radially inwardly of the annulus bore; and

means for securing the tubular member to the body;

5 wherein the radius of the outer diameter surface is less than the radius of the inner diameter surface; and

wherein the annulus port is defined between the outer diameter surface and the inner diameter surface.

add #3